DOCUMENT RESUME

ED 056 870 SE 012 578

TITLE	What Can You Do to Benefit Wildlife on Your Land?
INSTITUTION	Tennesee Valley Authority, Norris, Tenn. Div. of Forestry, Fisheries, and Wildlife Development.; Tennessee Game and Fish Commission, Nashville.
PUB DATE	69
NOTE	19p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Animal Science; *Conservation Education; Instructional Materials; *Land Use; *Manuals; Natural Resources; Plant Science; *Wildlife Management
IDENTIFIERS	Tennessee Valley Authority

ABSTRACT

Although this manual was developed by Tennessee Valley Authority (TVA) technicians in the management of TVA lands, it may be well utilized by private landowners interested in doing something for wildlife on their own property. The booklet includes basic information about wildlife in general and seven species in particular--the white-tailed deer, ruffed grouse, raccoon, and gray squirrel of the woodlands and the bobwhite quail, cottontail rabbit, and mourning dove found in the open fields. It suggests improvement practices which are inexpensive and may be scaled to individual interest and capacity. Pointers about wildlife around the home are also included. (BL)

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VHAT CAN YOU DO TO BENEFIT

VILDLIFE ON YOUR LAND?

FOREWORD

TVA biologists have developed a manual for use by technicians who are responsible for taking care of TVA lands throughout the Valley. It is felt that with some adaptations the information might be useful to private landowners interested in doing something for wildlife on their own property. This booklet includes basic information about wildlife in general and seven species in particular. It suggests improvement practices which are inexpensive and may be scaled to individual interest and capacity.

Where to Start . . .

Look around your land and that of your neighbors. See what kinds of wildlife you already have. This will be a *clue* as to what you might expect to attract to your land.

Next get a map of your property which shows open land, woods, house site, yard area, ponds or creeks, power lines, roads, and trails. An aerial photograph (available through your local Soil Conservation Service office) is an excellent map source if you own over 100 acres. If you own less, an air photo will not provide the detail you'll need, but a simple sketch map will serve as well. With a map in hand, you can systematically plan what, where, and when to make improvements.

Many kinds of wildlife can benefit from the practices suggested in this booklet. For instance, when a German millet food patch is planted for a covey of quail, song sparrows, juncos, cardinals, white-footed mice, woodchucks, and others share the bounty. Foxes, hawks, owls, weasels, and skunks — predators of woods and field — will also be helped. Don't worry about them. Predators serve a useful purpose in keeping wild animal populations in balance, weeding out those too sick or old to be able to survive the normal stresses of living in the wild.

What Can You Do for Wildlife
ON FOREST LAND . . .

Most wildlife use trees to meet some of their needs. Deer, squirrel, grouse, and raccoon are examples which spend most of their lives and obtain most of their wants within the forest.

If you are going to sell trees, have them marked by a forester. He will make sure that you keep a thrifty stand—trees that will provide acorns, nuts, and berries for wildlife while improving your woods for the future.

Leave at least two den trees per acre when cutting timber. These trees contain holes large enough for use by squirrels, raccoons, woodpeckers, opossums, and various songbirds. The best den trees are beech, sycamore, scarlet oak, black gum, post oak, black oak, northern and southern red oaks, maple, and elm.

Smaller trees and shrubs play an important role. Give special consideration to food- and cover-producing shrubs, vines, and small trees such as: wild grapes, haws, persimmon, blackberries, greenbriers, honeysuckle, dogwood, wild plum, wild raisin, mountain laurel, sourwood, and huckleberries. Tree cutting will allow sunlight to reach these smaller plants and the resulting increase of fruits will help wildlife.

Keep a variety of oaks and hickories. The more kinds you have, the less your chances of suffering a complete loss of nut production in a given year. When acorns are plentiful, there is no finer food. Generally, try to have at least 8 to 10 wildlife food trees per acre.

Timber stand improvement means cutting diseased, poorly formed, or overcrowded trees to allow better trees more growing space. This activity can benefit wildlife by stimulating low-growing plants, too.

When trees are sold, group them in units from ¼ acre up to 40 or even 50 acres on tracts of 2,000 acres or more. Of course, on small tracts (less than 25 acres), single tree selection may be the only practical way to harvest trees and keep stable wildlife conditions.

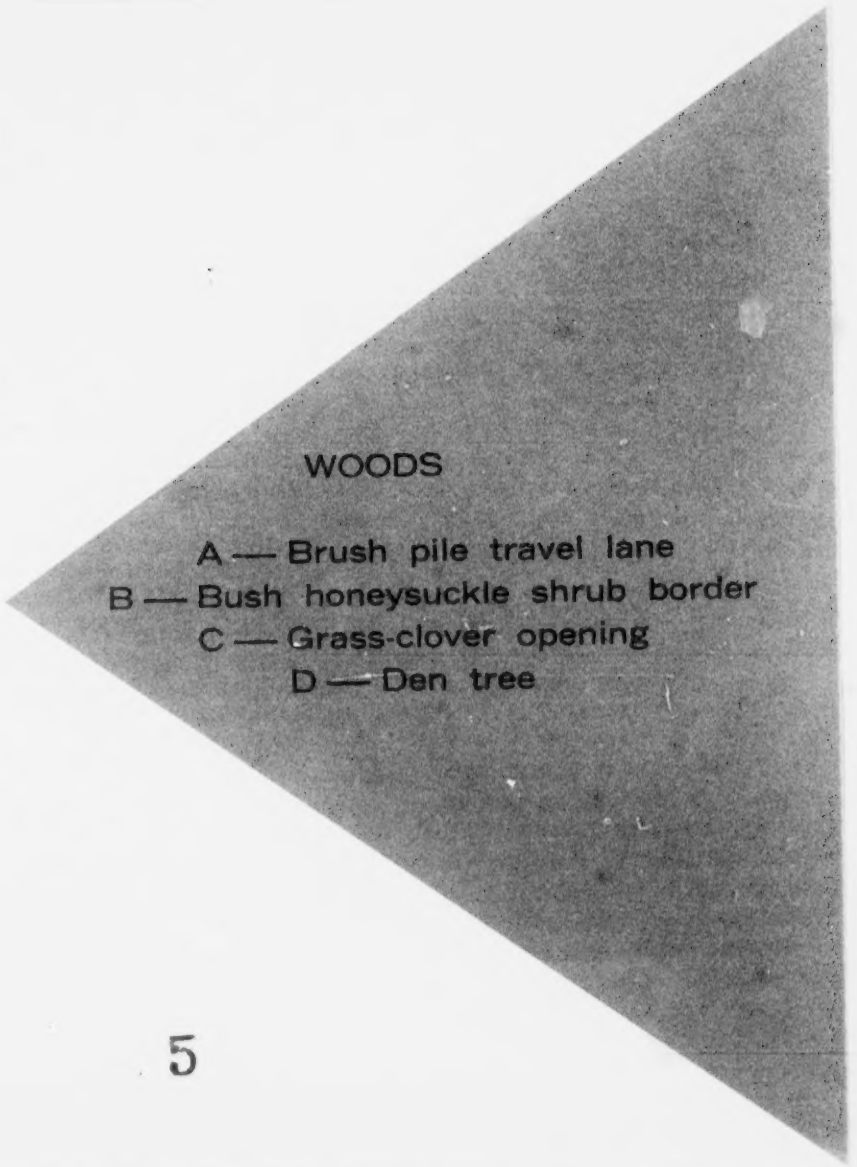
A few desirable trees may be "hinge-felled." Here, the stem is cut about ¾ through at 2 to 3 feet above ground and bent over. Trees less than 10 inches in diameter can be handled in this manner. This does not kill the tree but puts it in a horizontal position where it can still grow and bear fruit or browse for a number of years. Trees that are good wildlife browse producers include: red maple, sassafras, persimmon, black gum, dogwood, hawthorn, eastern red cedar, black cherry, ash, basswood, willow, cottonwood, and black locust.

Protection from wintry weather is required for many kinds of wildlife. Dense ground vegetation — preferably evergreen — is best. There are three ways you can provide winter cover:

1. Leave natural brush and vine tangles, rhododendron, laurel, pine or cedar thickets intact rather than burning or cutting them down.

2. Plant ½- to 5-acre patches of Virginia, white, shortleaf, or loblolly pine. Of the four, Virginia pine is best because it offers denser growth, retains live branches longer, and is generally slower growing. Best cover conditions arise from the fifth growing season through the fifteenth, so pine winter coverts can be harvested for pulp and replanted as soon as they are large enough to sell. There should be at least one patch of heavy cover for every 25 acres of woods (minimum size 1/10 acre).

3. Pile brush from treetops and limbs following harvest. (Keep brush piles from touching the trunks of live trees as dead wood will eventually attract insects and fungi which could also harm live trees.)



A
B
C
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WOODS WILDLIFE

White-Tailed Deer

A key element with deer is the area needed to fulfill his requirements. If you know deer are already present in your area, then you can go ahead and start trying to concentrate them on your land. If not, you will need to have at least 5,000 acres. Your neighbors could help meet this need.

White-tailed deer are vegetarians. They prefer the tender annual growth of trees and shrubs (browse); a wide assortment of weeds and grasses; and certain fruits. A deer must have nearly 2,000 pounds of food *yearly* to keep from starving! Acorns, when available, may form the bulk of fall and early winter diets, but a consistent production of desired woody vegetation kept within reach (up to 5 feet) is the chief means of maintaining deer.

While eating spring and summer "greens" deer require salt to help digest and utilize these foods. Scatter two or three salt licks where you would like to see the deer in the summer (one to every 300 acres is adequate for the deer's needs). Salt blocks are not necessary — the best licks are made by digging in the soil, dumping 25-50 pounds of rock salt on the loosened dirt, then mixing the salt and dirt with a shovel.

You probably will not see deer consistently. They travel from one to ten miles daily in search of food, sometimes seeking windy open ridges to escape swarms of flies. During severe winter weather or a summer thunderstorm, deer hide in dense, low-growing cover. Here also, the doe will seek temporary seclusion to give birth to her fawns and will not travel far away from them during the first two or three weeks of their life.

Ruffed Grouse

Ruffed grouse are typically birds of the forest. In the Tennessee Valley their present range is confined to the Appalachian forests—Cumberlands, Blue Ridge, Smokies, and lesser ranges.

Grouse have very specific habitat requirements and are constantly moving to satisfy these needs. However, annual movements don't exceed a home range of 40 acres. Females and broods tend to stay together, whereas males remain alone.

Best living conditions for grouse include 30 percent hardwoods (half acorn-bearing trees), 30 percent brush, 30 percent open land, and 10 percent pines and cedars. Small woods openings, bushy field edges, woods roads, and utilities rights of way form the bulk of usable open land for grouse.

Drumming logs where the males can strut during the mating season are essential. Logs protected by shrub cover are preferred, although stumps, rocks, and logs in the open woods are sometimes used. Evergreen thickets (laurel, pine, cedar, rhododendron, or honeysuckle) are also vitally important, giving needed protection during bad weather. There should be a couple of drumming logs and one good evergreen thicket per 40 acres if possible.

Grouse use a wide variety of plant foods and many insects. Half its diet is made of buds, leaves, flowers, and small twigs, over one-fourth of fruits (blackberries, grapes, etc.), one-tenth of insects, especially grasshoppers, and the remainder

of a variety of seeds and nuts. Trees which furnish fare for grouse include apple, birch, yellow-poplar, cottonwood, dogwood, cherry, beech, hazelnut, hop-hornbeam, ironwood, and willow.

Grouse are called "cyclic wildlife," that is, animals who *regularly* have periods of high and low populations. When grouse are at the high point of their cycle, there may be one per 3 to 5 acres. During lows you'll think there are none left! Blustery weather will force grouse to seek dense cover. If you have it on your land, you may see more grouse than usual; if you don't, those you have will go elsewhere.

Raccoon

Raccoon inhabit woods near ponds and streams containing salamanders, frogs, crayfish, and snails which comprise an important part of their diet. Ideal habitat is that found near water where part of a woods has been cleared for row-crop farming.

Some type of den is required with a minimum opening of 4 inches. Trees are preferred but rock piles or bluffs are used. The choicest openings are high above the ground. Try to leave at least one den tree suitable for raccoon per ¼ mile along a wooded stream bank. Two hundred acres is about the smallest unit that can be developed for raccoon.

The 'coon moves mostly at night so don't count on seeing this fellow often. However, a daytime check along a muddy stream bank or field edge can reveal his peculiar tracks — little feet and hands. His nightly forage may take him from a few hundred yards up to 1 or 2 miles. If he travels far, he will most likely hole up in a new den and not return until the next day or later.

Occasionally, there may be as many as one raccoon per acre in local concentrations, but usually they do not exceed one per 10 acres.

Gray Squirrel

You and your neighbors can count on having squirrel by meeting just one requirement: Have at least 10 acres of land on which there are five or more *nut-producing* trees per acre.

Gray squirrels are most at home in the woods, preferring mixed deciduous hardwoods (trees that lose their leaves each winter) or mixed pine and hardwoods with all age classes present.

At least two den trees per acre are needed. Squirrel nest boxes can be added in case you have to help meet this minimum requirement or want to increase dens to the more desirable 4 to 6 per acre.

Although the nuts of oaks, hickories, dogwood, and beech are preferred, squirrels use a wide variety of food including buds, pine seeds, roots, tubers, weed seeds, leaves, fruits, and insects. A squirrel needs about two pounds of food weekly.

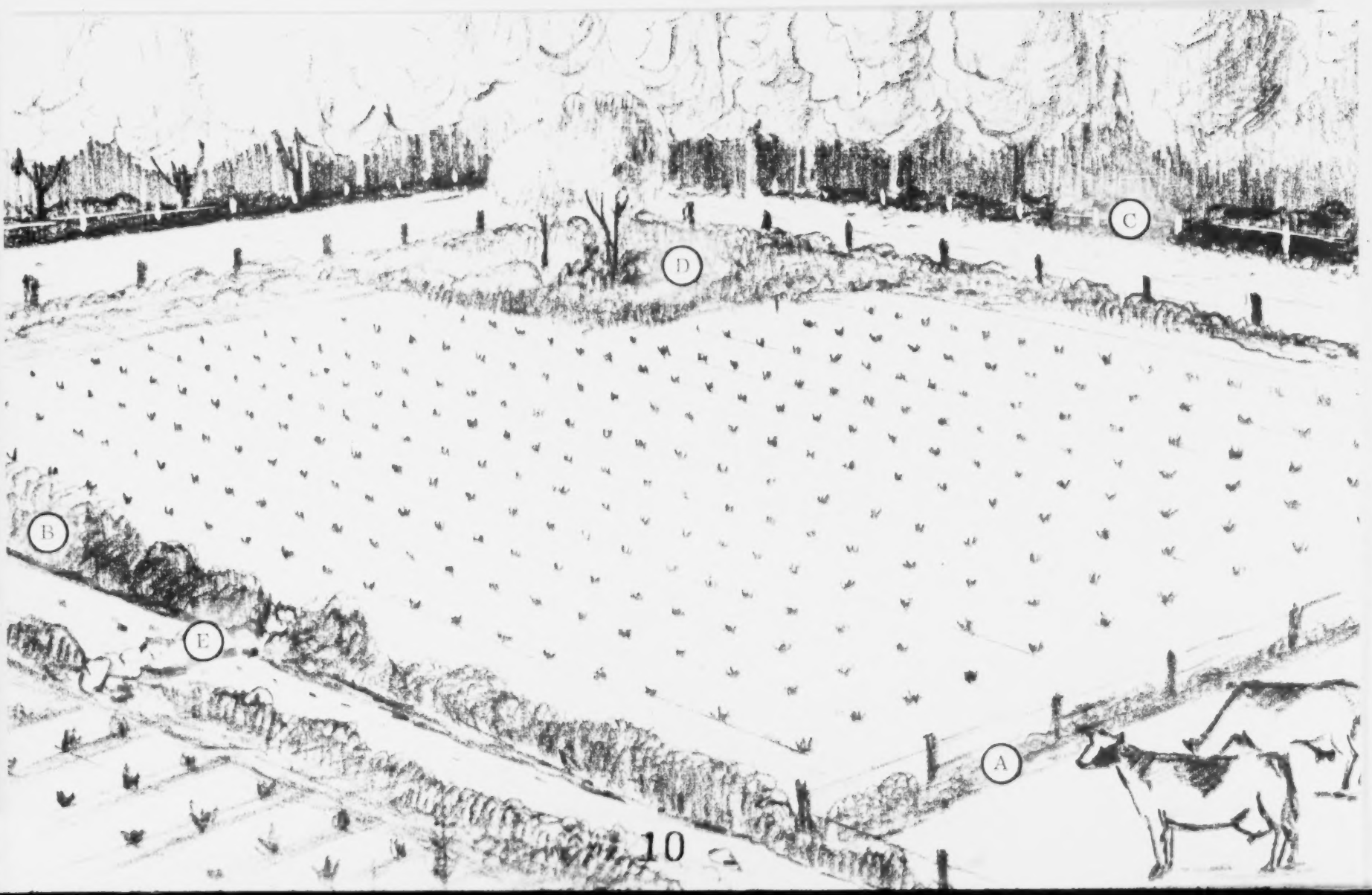
The mixed woods furnishes a greater variety and more stable supply of foods and offers superior facilities for dens. In overmature woods, where no cutting has been done, there is a risk that in years of acorn failure, no alternative foods will be available and squirrels may have to travel great distances to seek adequate supplies.

What Can You Do for Wildlife
ON OPEN LAND . . .

Open land — cultivated fields, pastures, lawns, or small openings in woods — can meet a variety of conditions for all kinds of wildlife. Quail, rabbits, and mourning dove are typical inhabitants of open fields. Most songbirds and non-game mammals are also benefited by practices geared for dove, quail, and rabbit. In open land what you *don't* do can be as important as what you do.

- Don't clean out all fence rows and odd corners because they look "weedy." Some of those "weeds" such as barnyard grass, poke, elderberry, panic grass, knotweed, and ragweed are fine wildlife foods.
- Don't burn old fields or pastures during the prime bird nesting season (May 1 through June).
- Don't mow hay in May or June, or, if you do, leave at least a 25-foot strip adjacent to best cover. When mowing, begin on the side farthest away from the best cover and gradually work towards the cover. This forces the wildlife into cover which can serve them until new growth again offers protection.
- Don't plow all your crop land in the fall but leave some near good cover so wildlife can feed on the waste grain and weed seeds during the winter.
- Don't let your cattle graze in your woods. Your trees will suffer from it and there will be less food and cover for wildlife.

OPEN LAND
A — Grassy travel lane
B — Native shrub border
C — Autumn olive-bicolor lespedeza border
D — Wildlife food plot
E — Rock dam


C
D
B
E
A

If you own land covered entirely by trees, you can still help open-land wildlife — and woods creatures — by seeing to it that from 2 to 5 percent of your woods are converted to small openings. These would not be used for crops but could be planted for wildlife.

Abandoned fields, orchards, road edges, old homesteads, rights of way, and timber harvest sites (clean-cut units) can be good woods openings. There should be one at least every ½ mile. Openings every ¼ mile would be much better. Size can vary from a minimum of ¼ acre to 10 acres or more.

These cleared areas can be allowed to grow back to trees or they can be set back periodically by bush-hogging to maintain low cover and food. If nothing is done after the trees are removed, seed eaters and browsers (quail, dove, rabbits, songbirds) will find ideal food and cover conditions for about three years. In the next 4 to 5 years browsers and budders (deer, rabbits, grouse) will still find good food and cover. After eight years of young tree growth, food is essentially gone.

Maintaining wider fence rows, field-woods borders, and road edges in wild flowers, grasses, and other residual growth will furnish some foods, act as nesting cover, and tie other food and cover areas together. These strips, called travel lanes, should be 10 to 30 feet wide.. Rework every 3 years by burning or disking, but stagger treatment so all travel lanes aren't disturbed in any one year. Lanes can be made of such materials as windrows of brush and stumps placed at 100-foot intervals. Planted strips are pleasing to the eye and can furnish dependable food and cover. Here are four kinds which you might want to try.

EDGE AND BORDER PLANTINGS

Rates for 20′ x 300′ strip

BICOLOR LESPEDEZA — STRAIN 100
2 pounds scarified seed or seedlings:
18″ apart in rows and rows 30″ apart
Plant when dormant (December 1 - March 1)

AUTUMN OLIVE
Drilled seeds or seedlings
18″ apart in row, rows 24″ apart
Plant in October
30 pounds 10-10-10

SERICEA LESPEDEZA
8 pounds scarified seed
Sow April 1 to June 1
85 pounds 3-12-12

BUSH HONEYSUCKLE
Seedlings
18″ apart in rows 24″ apart
Plant when dormant (December 1 - March 1)
30 pounds 10-10-10

Food patches can be located in idle corners, field-woods edges, or in eroded gullies. These are usually broadcast mixtures of annual plants plus occasional food-producing shrubs along one or more edges. They can be as small as ⅛ acre and usually do not exceed ½ acre. Preferably they are long, irregularly shaped strips adjacent to or within 100 feet of good cover. Try to have at least one food patch per 40 acres. If you set out to plant a food patch you might try one of these mixtures.

ANNUAL SEED MIXTURES

(pounds of each to be seeded per acre)
Broadcast and Cultipacked
fertilize as required

Buckwheat 20
Brabham cowpeas 10
Laredo soybeans 10
German millet 20
1 ton lime (pH 6. 0-6.5)
500 lbs. 6-8-6
Sow in June

Grain sorghum (at 8-10 pounds)
Use any one of these
Redbine -60, -66, or -58
Frontier 406 S, R, S. 610
McCurdy 70
500 pounds commercial fertilizer

Korean lespedeza 8
Yellow sweet clover 4
Orchardgrass 4

Sudangrass	12 lbs.
Dwarf Japanese broomcorn	18
Early amber sorghum	18
Buckwheat	8
Sunflower	8
German millet	7
Japanese millet	7
Hog millet	7
Kaffir corn	6
Wheatland milo	4
Flax	3
Dwarf Essex Rape	2
Sow at 15-20 lbs. per acre	100 lbs.

In woods openings and in idle field corners it may be more desirable to plant things that do not require annual replanting. Here are some perennial mixtures you may want to try. Check with your local agricultural agent to see which ones are best suited for your land. Fall plantings are best, followed by late winter (February 15 - March 15).

PERENNIAL SEED AND GREEN FORAGE MIXTURES

(pounds of each to be seeded per acre)
Broadcast and Cultipacked

GRASS-CLOVER MIXTURES
Velvet grass 15
Dutch white clover 2

Kentucky fescue 20
Ladino clover 10

Kenwell fescue 20
Dutch white clover 4

RESEEDING ANNUALS
Large Partridge Pea 16
Cultipack
Sow March 1 - April 15
1 ton lime
400-600 lbs. 0-20-20
Burn every 2-3 years between
February 1 and February 15

LESPEDEZAS
Kobe Lespedeza 35
Common Lespedeza 25
Korean Lespedeza 30
Sow February 15 - March 15
1 ton lime
500-600 lbs. 0-16-8
Rough disk or burn February 1-15
Apply 300-400 lbs. 0-16-8 per year

PERENNIALS — CLOVERS
#1 White clover 2-4
#2 Button clover 20 (Scarified)
#3 Crimson clover 20
#4 Red clover 10
Sow in fall (September - October)
Harrow #2 and #3 each August
to reseed
Innoculate as required
Lime to pH 6.0-6.5 for #1 and #3
400-600 lbs. 0-12-12 or 2-14-14

GRASSES
Kentucky 31 fescue 30
Kenwell fescue 30
Orchardgrass 30-50
Tall oak grass 30-50
Velvet grass 10-20
Sow in fall
Lime for pH 6.0-6.5
500 lbs. 8-8-8

Bobwhite Quail

Bobwhite rarely travel over one mile from the place they were born, but will cover ¼ mile daily searching for food. So, 40 acres is the smallest unit which can be managed to meet *all* daily habitat requirements.

Nest sites favored are old fence rows in grasses and weeds. Also used are vine and shrub tangles, idle field corners, and brush and grass mixtures along woods edges, creeks, or swamps.

Best habitat includes equal amounts of trees, grass, brush, and cultivated fields with well distributed openings. Ground vegetation favored is principally herbaceous legumes (partridge peas, beggar's ticks, common lespedezas). These kinds of cover are essential, but equally important is the location of cover types in respect to each other. Random mixtures of each type usually work best.

Quail are primarily seed eaters, but insects are important especially for young birds. Plant foods include leaves, stems, and seeds in the spring; fleshy fruits, seeds of grasses and sedges in summer; and cultivated crop seeds, acorns, seeds of legumes, and other nuts in the fall and winter.

Grit (small stones or rock chips) is needed and may have to be supplied if it is not available on quail range. Dusting spots are needed to control body parasites and condition feathers. Exposed soil in fields, road banks, eroded sites, etc., are satisfactory. Where lacking, they can be supplied with a few turns of a shovel near good cover. One spot in 40 acres is enough.

Coveys usually range over 150 to 300 acres or more annually. Maximum fall populations may reach one quail per 1 to 2 acres, but one per 6 to 12 acres is about typical on good range.

Cottontail Rabbit

Much of what is good for quail is good for rabbit so what you do for one favors the other.

Optimum living conditions are on agricultural lands where crops, grasses, woods, and brush are about equally represented and well distributed. Nesting cover is required, but can be of most any type since the female depends on her

ability to camouflage the nest. Closely grazed pasture is the least acceptable. Best escape cover is vegetation and materials too dense for easy penetration by predators — especially dogs. Best width of travel lanes for rabbits is 20 feet. They are rarely found more than 100 feet from good cover, so best living conditions would ensure that needed food is within this range.

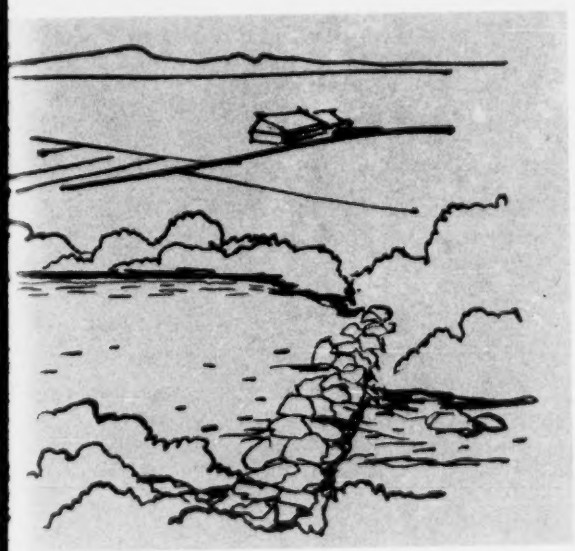
Rabbits are strict vegetarians, feeding on an enormous variety of plants. Yearly diet is a mixture of stems, leaves, fruits, seeds, bark, weeds, and twigs. Particularly important trees and shrubs include sumac, yellow-poplar, black gum, dogwood, hawthorn, apple, white oak, elderberry, winged elm, briers, red elm, sassafras, willow, grape, wild rose, blueberry, and black cherry. Other favored plants include: crabgrass, clover, plantain, sheepsorrel, panic grass, goldenrod, redtop, bluegrass, orchardgrass, fescue, wild strawberry, and wild millet. Agricultural crops include: wheat, oats, soybeans, corn, and a variety of garden vegetables.

Rabbits have a home range much smaller than quail, averaging from 1 to 10 acres. Maximum density seldom exceeds 2 rabbits per acre, and one per 3 acres is considered good. On poor range (typically a combination of extensive closely grazed pastures and upland hardwoods) rabbit populations rarely are better than one per 10 acres.

MOURNING DOVE

Dove employ their alertness, eyesight, and speed of flight to escape from danger, so open land which looks impossible for rabbit or quail is frequented by dove — if suitable foods are present. Nesting cover is not essential on a given piece of property because dove will fly considerable distances to feed. Cover can be provided, however, to give year-round use of your land. Pine plantations are particularly useful as are cedar thickets and fruit orchards. Dove need water; a farm pond, particularly near trees, is ideal. Small streams with dense overstory are not usable unless some clearing is done.

The favorite feeding places are fields, orchards, or other weedy areas where seeds can be found easily. Commercial crops used include milo, corn, wheat, barley, rice, soybeans, cowpeas, oats, millet, and buckwheat. If you have an orchard, try sowing German or browntop millet between the rows of trees to attract dove (and many songbirds).



What About Water?

You can count on having more wildlife such as muskrat, snipe, kildeer, and bullfrogs if some dependable source of water — adjacent to good cover — is available. If you do not have a spring, creek, or natural lake on your property, construction of a small pond may be in order. Contact your local Soil Conservation Service man, who can help you design a suitable one. Springs or small creeks may dry up in summer but their use can be prolonged by making small dams on your stream, using either rocks or logs.

Wildlife Around the Home

You can make your house lot a "mini-refuge" for wildlife if you just follow the theme of this booklet — variety. Break up large expanses of lawn with clumps of flower beds, trees and shrubs useful for landscaping — and wildlife. Put some next to your house too, so that you don't have to depend entirely on artificial feeding to draw wildlife close to you. Here are some of the best trees and shrubs:

ORNAMENTAL TREES AND SHRUBS

TALL SHRUBS
Farkleberry (evergreen)
Autumn olive
Russian olive
Laland firethorn (evergreen)
Chinese Photinia (evergreen)
Japanese privet
Common juniper (evergreen)
Inkberry (evergreen)
Yaupon (evergreen)
Silky dogwood
Doublefile viburnum
Possum-haw viburnum

SHORT SHRUBS
Beautyberry
Dwarf yaupon (evergreen)
Common winterberry
Almond cherry
Japanese barberry
Coralberry
Snowberry
Laurestinum viburnum (evergreen)
Chinese firethorn (evergreen)
Pfitzer juniper
Arrowwood viburnum

TREES

Dogwood	Mountain ash
Crabapple	Norway maple
American holly (evergreen)	White pine
Common laurelcherry	Norway spruce
Black cherry	Pecan
Common cedar (evergreen)	Walnut

Flowers furnish attractions and food for a variety of insects, which in themselves are interesting fellows not deserving the bad reputation generally falling on their shoulders. If your flower beds catch a migration of Monarch butterflies, this could be the highlight of the year! An abundance of red flowers, nectar-rich petunias, morning-glories, geraniums, or sultana may bring the "humming" activity of rubythroated hummingbirds.

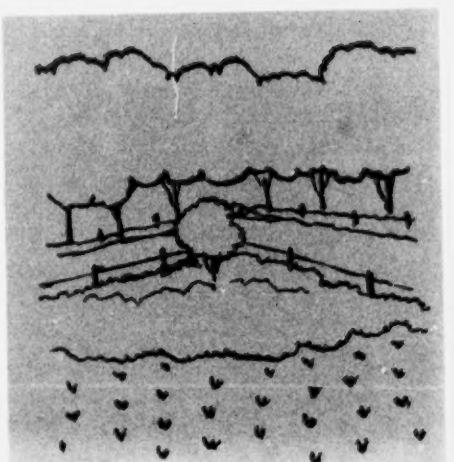
Food trays and boxes placed on posts, hung in trees or made as window shelves can attract juncos, towhees, woodpeckers, chickadees, cardinals, nuthatches, titmice, and many others. Any good wild bird seed mix will do, the best being 100 percent sunflower seed. These feeding stations should be supplemented with suet to help round out the diet in winter. Sliced apples, raisins, and lettuce leaves are also appreciated by feathered folk, and, of course, water can be provided when not available naturally.

Most birds naturally nest in trees or bushes and well-planned plantings will handle their requirements. Still, there is a lot of pleasure in making or buying birdhouses for bluebirds, wrens, swallows, chickadees, nuthatches, woodpeckers, or martins.

HOW DOES YOUR LAND MEASURE UP . . .

WOODS	BEST	GOOD	POOR
Den trees (per acre)	4-6	2-4	less than 2
Kinds of oaks and hickories	10 or more	5 to 10	less than 5
Size of trees	½ or more 15″ + dia.	¼-½ trees 15″ + dia.	below ¼ 15″ dia.
Wildlife food trees and shrubs (per acre)	over 10	8 to 10	below 8
Winter coverts (per 50 acres)	over 2	2	less than 2
Woods openings (per 50 acres)	over 5 acres	1 to 5 acres	less than 1 acre

OPEN LAND	BEST	GOOD	POOR
Travel lane widths (fences, field edges, etc.)	30′	10-30′	below 10′
Number of usable travel lanes (not cleaned out)	over ½	¼ to ½	less than ¼
Food patches (per 80 acres)	over 2	2	less than 2
Lawn landscaping (open space between useful trees, shrubs & flowers)	25′-50′ best wildlife kinds	25′-50′ any kind	more than 50′ any kind



A Word of Warning . . .

One more general comment regarding wildlife on your land. You cannot expect wildlife to increase if you allow your dog or your neighbor's dogs freedom to roam through your property at will. Free-roaming dogs — many of them family pets — can be one of the most serious threats to wildlife, particularly deer, that we have in the Tennessee Valley.

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